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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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09/426,087 10/22/99 DRURY

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MM92/1003

EXAMINER

FEGGINS, K

ART UNIT

PAPER NUMBER

2861

DATE MAILED:

10/03/01

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary

Application No.

09/426,087

Applicant(s)

DRURY ET AL.

Examiner

K. Feggins

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on Amendment (filed 2Jul 01).
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☐ Claim(s) _____ is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-17 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

2. Claims 1-3, 6 & 12 are rejected under 35 U.S.C. 102(e) as being anticipated by Nojima et al. (6,168,263 B1).

Nojima et al. discloses the following claimed limitations:

- * droplet déposition apparatus (Abstract)
- * a fluid chamber having actuator means actuatable by electrical signals to effect ejection of droplets from the fluid chamber (Abstract)
- * drive circuit means for supplying the electrical signals to the actuator means (col 1, lines 33-50, 61-67, col 2, lines 1-11, col 6, lines 48-67, col 8, lines 50-68, fig 6)
- * conduit means/channels/ for conveying droplet fluid to and from said fluid chamber, said drive circuit means being in substantial thermal contact with said conduit means so as to transfer a substantial part of the heat generated in said drive circuit to said droplet fluid (col 6, lines 48-67, col 29, lines 31-50, fig 52)

* first conduit means for supplying droplet fluid to said fluid chamber and second conduit means for leading droplet fluid from said fluid chamber (col 5, lines 61-67, col 6, lines 1-11, col 29, lines 31-50, col 31, lines 11-18, figs 52, 54)

* wherein said drive circuit means is thermally connected to the second conduit means (col 5, lines 61-67, col 6, lines 1-29, col 8, lines 32-59, figs 1-2 & 6)

* at least on droplet ejection unit comprising a plurality of fluid chamber, actuator means and a plurality of nozzles arranged in a row, said actuator means being actuable to eject a droplet of fluid from a fluid chamber through a respective nozzle (col 39, lines 29-67, fig 66)

* a support member for said at least on droplet ejection unit, said support member comprising at least one droplet fluid passageway communication with said plurality of fluid chambers and arranged so as to convey droplet fluid to or from said fluid chambers in a direction substantially parallel to said nozzle row and to transfer a substantial part of the heat generated during droplet ejection to said conveyed droplet fluid (Abstract, col 5, lines 61-67, col 6, lines 1-17, col 35, lines 46-62, figs 1-3, 66)

* a plurality of said droplet ejection units, the support member supporting the droplet ejection units side by side in the direction of the nozzle rows, the support member comprising at least one droplet fluid passage way communication with at least two of said ejection units and arranged so as to convey droplet fluid to or from said

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ejection units in a direction substantially parallel to said nozzle rows and to transfer a substantial part of the heat generated during droplet ejection to said conveyed droplet fluid (col 5, lines 61-67, col 6, lines 1-17, 48-67, col 8, lines 32-67, col 9, lines 1-10, col 35, lines 46-62, figs 1-3, 6-7, 59-62).

3. Claims 13-17 are rejected under 35 U.S.C. 102(e) as being anticipated by Silverbrook (6,171,875 B1).

Silverbrook discloses the following claimed limitations:

- * droplet deposition apparatus (Abstract)

- * a fluid chamber, at least part of which is formed from a first material having a first coefficient of thermal expansion, said chamber being associated with actuator means actuable to eject a droplet from the chamber and having a port for the inlet of droplet fluid thereto (Abstract, col 3, lines 4-67, col 4, lines 1-57, figs 1-5)

- * a support member/supply channels/ for said fluid chamber and including a passageway for supply of droplet liquid to said port, the support member being defined at least in part by a second material having a second coefficient of thermal expansion greater than said first coefficient (Abstract, col 5, lines 1-21, 58-67, col 6, lines 1-67, figs 1, 5)

- * means for attaching the fluid chamber to the support member in order to substantially avoid transfer of thermal deformation of the support member to said fluid chamber (Abstract, col 4, lines 36-57, col 5, lines 1-46, figs 4-13)

* wherein the attachment means comprises resilient bonding means for bonding the fluid chamber to the support member (col 3, lines 36-67, col 4, lines 1-5. figs 1-3)

* wherein the or each fluid chamber comprises a channel formed in a body of piezoelectric material and closed by a cover member substantially thermally matched to the piezoelectric material (Abstract, col 7, lines 5-27)

* wherein ink supply ports/slots are formed in said cover (Abstract)

* wherein at least one ink ejection nozzle is formed in said body of piezoelectric material (Abstract, col 7, lines 5-27)

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 4-5 & 7-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nojima et al. (6,168,263 B1) in view of Allen et al. (EP 0 564 102 A2).

Nojima et al. disclose all of the claimed limitations except for the following:

* wherein the drive circuit is incorporated within an integrated circuit package/chips, of substantially cuboid form in which at least some of the faces are rectangles

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each having a surface area, a face other than that face having the smallest surface area being arranged so as to lie substantially parallel to the direction of fluid flow in that part of the conduit closest to said face, and to be in substantial thermal contact with the fluid

* wherein the face having the greatest surface area is arranged so as to lie parallel to the direction of fluid flow

* wherein the droplet fluid passageway occupies the majority of the cross-sectional area of the support member

* wherein the droplet fluid passageway comprises respective portions for conducting droplet fluid into and away from each fluid chamber

* wherein the cross-section of support member is wider in the direction of ink ejection from the nozzles than in the direction of the nozzle row

Allen et al. disclose the following claimed limitation:

* wherein the drive circuit is incorporated within an integrated circuit package/ chips, of substantially cuboid form in which at least some of the faces are rectangles each having a surface area, a face other than that face having the smallest surface area being arranged so as to lie substantially parallel to the direction of fluid flow in that part of the conduit closest to said face, and to be in substantial thermal contact with the fluid

(col 39, lines 53-67, col 40, lines 42-48) for the purpose of enabling printing at virtually any location on the printing medium

* wherein the face having the greatest surface area is arranged so as to lie parallel to the direction of fluid flow (col 5, lines 21-55, figs 1a) for the purpose of increasing the speed of printing per line.

* wherein the droplet fluid passageway occupies the majority of the cross-sectional area of the support member (figs 1a, 4, 5) for the purpose of reducing cost of printheads construction.

* wherein the droplet fluid passageway comprises respective portions for conducting droplet fluid into and away from each fluid chamber (figs 1a, 4, 5) for the purpose of distributing ink to the printhead.

* wherein the cross-section of support member is wider in the direction of ink ejection from the nozzles than in the direction of the nozzle row (figs 1a, 4, 5) for the purpose of providing a printer capable of printing across any desired width.

It would have been obvious at the time of the invention was made to a person having ordinary skill in the art to utilize a drive circuit that's incorporated within an integrated circuit package, of substantially cuboid form in which at least some of the faces are rectangles each having a surface area, a face other than that face having the

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smallest surface area being arranged so as to lie substantially parallel to the direction of fluid flow in that part of the conduit closest to said face, and to be in substantial thermal contact with the fluid; a face having the greatest surface area is arranged so as to lie parallel to the direction of fluid flow; the droplet fluid passageway occupies the majority of the cross-sectional area of the support member and comprises respective portions for conducting droplet fluid into and away from each fluid chamber; a cross-section of support member is wider in the direction of ink ejection from the nozzles than in the direction of the nozzle row, taught by Allen into Nojima et al. for the purposes for the purpose of enabling printing at virtually any location on the printing medium, increasing the speed of printing per line, reducing cost of printheads construction, distributing ink to the printhead and for providing a printer capable of printing across any desired width.

6. Claims 10-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nojima et al. (6,168,263 B1) in view of Drake (EP 0 512 799 A2).

Nojima et al. disclose all of the claimed limitations except for the following:

* wherein the support member comprises material having a higher thermal conductivity than said at least one droplet ejection unit.

* means for attaching said at least one droplet ejection unit to the support member in order to substantially avoid transfer of thermal deformation of the support member to said at least one droplet ejection unit

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Drake discloses the following claimed limitations:

* wherein the support member comprises material having a higher thermal conductivity that said at least one droplet ejection unit (col 11, lines 28-55, col 12, lines 48-58, col 13, line 1) for the purpose of preventing warping of the printbar due to the operation of the printhead operating temperatures.

* means for attaching said at least one droplet ejection unit to the support member in order to substantially avoid transferal of thermal deformation of the support member to said at least one droplet ejection unit (col 11, lines 28-55, col 12, lines 48-58, col 13, line 1, figs 6, 9) for the purpose of providing an improved pagewidth thermal ink jet printhead.

It would have been obvious at the time of the invention was made to a person having ordinary skill in the art to utilize a support member with a material having a higher thermal conductivity that said at least one droplet ejection unit and means for attaching said at least one droplet ejection unit to the support member in order to substantially avoid transferal of thermal deformation of the support member to said at least one droplet ejection unit, taught by Drake into Nojima et al. for the purpose of preventing warping of the printbar due to the operation of the printhead operating temperatures and providing an improved pagewidth thermal ink jet printhead.

Response to Arguments

7. In response to Applicant's argument with respect to the conveying of fluid to and from a vaporization chamber, and heat generating during operation of the printhead to fluid conveyed by conduit means and transferring of heat generated during droplet ejection to the ink contained in the reservoir are acknowledged. However, please refer to the above Office Action, with respect to Nojima et al., Silverbrook and Nojima et al. in view of etc., for the disclosure of the conveying of fluid to and from a vaporization chamber, heat generating during operation of the printhead to fluid conveyed by conduit means and transferring of heat generated during droplet ejection to the ink contained in the reservoir

Furthermore, it would be obvious to one skilled in the art at the time of the invention to utilize heating elements that provides heat to the ink in order to decrease or increase the inks viscosity or the rate of speed in which the ink flows through (in and out of) ink channels, pipes, tubes, conduit, etc., based on the resultant image density desired during printing.

Conclusion

8. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within

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TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to K. Feggins whose telephone number is 703-306-4548. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, N. Le can be reached on 703-308-0750. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7722 for regular communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

KF

September 26, 2001



N. Le
Supervisory Patent Examiner
Technology Center 2800